A narrative review of the risk factors and psychological consequences of injury in horseracing stable staff

Abstract

Horseracing stable staff have a multifaceted role, acting as care givers, skilled athletes and equine experts, resulting in inherent high emotional, physical and mental demands. Despite these demands, and reports of significant injury risk to those working in racing at ground level, there has been no research investigating the psychological risk factors for injury in UK racing stable staff and how psychological responses to injury may affect long term mental health and wellbeing. With mental health at the forefront of industry consideration, this narrative review aimed to reflect on the current literature to propose occupational, life and social stressors that may be increasing the risk of injury in racing staff. In addition, this review aims to apply current injury theory to propose whether stable staff are at heightened risk of injury mismanagement. A literature search was undertaken to investigate the psychological aspects of injury, using five search engines and the following key words: injury, psychological responses, occupational, sport and/or athlete, equestrian, horseracing, jockey, risk of injury, rehabilitation, and injury minimisalisation. Articles were selected based on relevance to review aims, and research findings were synthesised under two primary areas: predictors of injury (working hours, job security, job control, life stressors, mental health and drug misuse) and responses to injury (positive and negative responses to injury, the role of social support, rehabilitation adherence, and injury minimalization). Whilst there are limitations to narrative reviews, this study provides a novel interpretation of injury risk and responses specific to staff working in horseracing, where injury-related challenges are currently a key focus for sector employees, managerial staff and racing organisations. Recommendations for further research have been made to direct the advancement of knowledge in the field.

Keywords: stress, cognitive appraisal, racing groom, occupational health, psychological responses

Introduction

Stable staff, also known as racing grooms, have a multifaceted role within the horseracing industry, acting as care givers, skilled athletes and equine experts (NARS, 2019; Racing Welfare, 2012) which often results in a role with inherent high emotional, physical and mental demands, and subsequently high injury rates amongst staff (Cassidy, 2002; Racing Welfare, 2012). British horseracing employs over 6,700 racing staff, across 550 licenced race yards responsible for the care and training of 23,599 horses in the United Kingdom (BHA, 2019). The role of stable staff has become a recent focus for the British Horseracing Authority (BHA), with plans for the publication of a "People Strategy" to follow the recently released Horse Welfare Strategy (BHA, 2020). In previous years, the social demand for strict welfare standards in horse racing has led to a culture of 'putting the horse first' (Butler *et al.,* 2019). These priorities have resulted in an industry which maintains that it has some of the highest welfare standards in the equestrian sector, that has continuously worked to promote the application of scientific evidence-based training and welfare principles and to upskill staff to maintain those standards (BHA, 2020; Butler *et al.,* 2019; Juckes *et al.,* 2020). However, the 'horse first' culture may have inadvertently reinforced a workforce who deprioritise their own health and wellbeing to care for the horse, which has been previously reported in other animal care sectors (Figley and Roop, 2006). Employees who ignore their own health needs may experience higher levels of physical and mental stress, which can increase risk of occupational injury and may impact the efficiency of the workforce (de Castro and Fujishiro, 2010; Dembe *et al.*, 2005; Singh and Conroy, 2017).

Compared to other occupational fields, racing staff have been shown to have a very high injury incident rate, with over 50% of yards reporting accidents (Filby *et al.,* 2012; Filby and Jackson, 2016; Racing Welfare, 2012). Core stable staff (track riders, racing grooms) were involved in 82% of all reported accidents (Filby *et al.,* 2012). Very few studies have formally investigated injury in stable staff (Filby *et al.,* 2012; Filby and Jackson, 2016; Speed and Anderson, 2008), with most focusing on the jockey due to the impact that injury would have on a jockey's race performance and earning potential. Whilst jockey injury is typically associated with falls during training and racing and is well documented (Hitchens *et al.,* 2019; Turner *et al.,* 2002; Turner *et al.*, 2012), a different profile of injury is evident in stable staff, with 46-48% injuries occurring at ground level. Stable staff also experience an increased risk of injury in the lower extremities (legs, feet) and back compared to jockeys (30% vs. 23% and 16% vs. 9%, respectively) (Cowley *et al.,* 2007). The greater manual labour and contact hours with the horse in comparison to jockeys may explain the differences in injury profile, reflecting the multifaceted nature of stable staff, and may suggest additional occupational risks that are not seen in jockeys (Filby *et al.,* 2012; Racing Welfare, 2012) despite both working in high risk occupations (Speed and Anderson, 2008). Significant research exists in equestrian sport about the role the horse plays in injury risk in both ridden and handling roles (see Asa *et al.*, 2019 for full review), however there is a limited understanding of the additional risk factors for injury associated with occupational stressors for staff working in the racing sector.

Recent horseracing sector-based research noted the disregard for personal injury in stable staff (McConn-Palfreyman *et al.,* 2019) and a culture of presenteeism, turning up to work when injured or unwell, which could suggest an injury minimalization culture forming within racing (Cassidy, 2002; Cohen *et al.,* 2019; Sauers *et al.,* 2016; Sear, 2018). Previous research and anecdotal reports have highlighted that whilst staff experience high levels of injury, the likelihood of reporting injuries, seeking time off or treatment, or resting during recovery is low (Filby *et al.,* 2012; Filby and Jackson, 2016; Racing Welfare, 2012; Sear, 2018). This culture may promote an industry that continue to work whilst injured, stated by Filby *et al.,* (2012) as

"the walking wounded", reducing not only the efficacy of the workforce, but influencing long term physical and mental health of stable staff. The unique nature of the role of stable staff, along with the culture considerations of horseracing as a competitive sport and industry, poses a novel situation within which to consider the psychological implications of injury.

The purpose of this narrative review was to investigate the unique occupational and psychosociocultural stressors within the horseracing industry that may increase the risk of injury to stable staff, and to apply current injury theory to determine whether stable staff are at heightened risk for mismanagement of injury. Specifically, this review will report the proposed occupational and psychosociocultural risk factors for injury in horseracing stable staff; propose psychological responses to injury with unique considerations of this population and explore whether an injury minimalization culture may be influencing stable staff health and wellbeing. The result of such a review could have important implications for increasing staff education around injury management, and the design and training of interventions for employers and employees to optimise psychological recovery from injury in stable staff.

Methods

Search Method

A literature search concerning occupational injury was conducted using online database search engines, including Science Direct, PubMed, Psychinfo via Ovid, Google Scholar, and the University of the West of England Library with no restrictions placed on country or publication date. Search strategies focused on the initial inclusion of titles and/or abstracts containing the key words: injury, psychological responses, occupational, sport and/or athlete, equestrian, horseracing, jockey, risk of injury, rehabilitation, or injury minimisalisation. This initial search was followed by crosschecking reference and citation lists (backwards search) and locating newer articles that included the originally cited paper (forward search) (Darlow and Wen, 2016). In addition, industry reports obtained through personal communication with Racing Welfare (UK) were included to supplement the research, including: Racing Welfare's Change of Pace (2012) Report, Filby and Jackson (2016) "Thoroughbred Breeding Associations Expert Report on Accidents", Speed and Anderson (2008) "The health and welfare of Thoroughbred Horse Trainers and Stable Employees", Racing's Occupational Health Services Annual Reports (2018, 2019), and an unpublished MBA thesis entitled "Occupational Stressors for Racehorse Trainers". These were primarily used to supplement the literature found, and to provide injury statistics within the horseracing sector. The search was performed by the first author between September 2019 and March 2020.

Study Inclusion Criteria

Inclusion and exclusion criteria were developed to identify key areas of interest, informed by previously published research (Green *et al.*, 2006). The inclusion criteria included: the article was required to be written in the English language, the article focused on the study of musculoskeletal injury and was available as full text. To maximise the search range available, due to a paucity of published research on horseracing-related injury, inclusion crtieria included research from 2000 – May 2020. Commissioned horseracing industry reports were included in the criteria for review, as these reports act as key sources of industry data and reporting, and are often utilised in the industry to support change. Studies were excluded if they did not focus on either risk factors or responses to injury or if they discussed life-altering injuries, such as paralysis, as that was beyond the scope of this review. Editorial pieces and methodological validation studies were also excluded from this review.

Information Extraction

Information concerning risk factors for injury, predictors of work or sports-based injuries, psychological responses to injury, adherence to rehabilitation, and injury culture (either work or sport) was extracted from the articles. Information gathered for each study primarily concerned the purpose of the study reviewed, the study design and execution, study findings including participant demographics, and the conclusion drawn by the authors (Green *et al.*, 2006). The research was synthesised into a comprehensive review of injury predictors and factors influencing responses to injury that may pose unique discussion and application to those working within horseracing.

Discussion

The purpose of the current study was to review the occupational and psychosociocultural risk factors for injury in horseracing stable staff, and to apply current injury theory to determine whether stable staff are at heightened risk for mismanagement of injury. The following themes emerged from the review as predictors of injury appropriate to working in the horseracing industry: working hours, job security, job control, life stressors, mental health and drug misuse. Additionally, in response to injury, the following themes were identified for consideration specific to the racing sector: positive and negative responses to injury, the role of social support, rehabilitation adherence, and injury minimalization.

Predictors of staff injury in horseracing

Occupational risk factors

Organisational structure and working conditions have previously been reported as causal factors for injury risk in occupational settings (Singh and Conroy, 2017). A number of predictors of injury in the horseracing sector were identified during the review process, including the following occupational specific predictors: working hours, job security and job control. Working in racing is considered dangerous; the unpredictability of the horse, manual labour and long hours can result in increased risk of injury to those working within the sport (Speed and Anderson, 2008). Dembe *et al.*, (2005) proposed that increased working hours increased the risk of injury in employees by 84%, whilst for those working specifically in the nursing profession, it is reported that working over 40hrs per week increased the risk of work-based illnesses, sick days and back pain (de Castro and Fujishiro, 2010). Disruption of circadian rhythms, greater levels of fatigue and lack of recovery time were found to increase the risk of injury observed in wider employment sectors, as well as staff working unsociable hours, where typically there were less staff per shift than comparable shifts during the day (de Castro and Fujishiro, 2010; Dembe *et al.*, 2005). Similar patterns of unsociable and long hours are seen in the racing industry, with trainers reporting long work hours as one of their main sources of stress (Sear, 2018). In addition, over 85% of stable staff surveyed in Australia reported working more than 40 hours per week averaging 46hrs per week in full time roles (Speed and Andersen, 2008). The National Association of Racing Staff (NARS) state that no employee should work more than 48 hours per week on average over a 7-day period in the UK (NARS, 2019), however limited data are available to confirm the actual average weekly hours. Whilst occupational health research often reveals that longer working hours results in increased stress responses and injury concern, the wider literature would suggest a more nuanced relationship, based on interactional models of stress (Angrave and Charlwood, 2015). The Person-Environment (P-E) Fit theory assumes that "*organisational behaviour rests on the…fit between the person and the environment and that stress occurs when there is an incompatibility between the two*" (Angrave and Charlwood, 2015; Friedland and Price, 2003; Kristoff, 1996; Sear, 2018, pp. 16). P-E Fit theory has proposed that when a person is working more or less hours than they would like, stress occurs due to the mismatch between actual and preferred work hours, which decreases job satisfaction and wellbeing (Angrave and Charlwood, 2015; Kristoff-Brown *et al.*, 2005).

This would therefore suggest that if there is a mismatch between preferred hours for racing staff and expected hours based on the demands of the role, stress levels would increase in this population, which could affect injury incidence.

Reports of increased pressure due to a "relentless" fixture list (Juckes *et al.*, 2020; Sear, 2018; Speed and Anderson, 2008) and lack of work-life balance are emerging in the racing sector, resulting in staff who have less time to unwind, relax and recover after work (Juckes *et al.*, 2020; Sear, 2018). Fixture numbers have increased by 6% to a current figure of 1,511 planned race days for 2019 across Flat and NH seasons, compared to 1,429 in 2014 (BHA, 2019). The inability to recover can lead to accumulation fatigue, or burnout, impacting coping mechanisms and leading to poor decision making, which may result in a higher risk of occupational injury (de Castro and Fujishiro, 2010; Dembe *et al.*, 2005). Despite the memorandum of agreement between the National Trainers Federation (NTF) and The National Association of Racing Staff (NARS) stating that staff returning from racing after midnight will not be required to start work before 9.30am the following day, trainers often state that this is difficult to facilitate (Sear, 2018). Racing stable staff identified this as a major issue for them on a day to day basis, resulting in a consistent and prolonged lack of sleep (Racing Welfare, 2012). The unseen impact of a demanding fixture list on sleep and working patterns of stable staff has yet to be investigated but could result in high injury rates amongst stable staff. Issues of poor horse welfare can also arise when staff are not fully engaged in their daily tasks, a potential consequence of physical and mental fatigue from the current fixture schedule (Butler *et al.*, 2019). Although a multi-billion-pound industry, the infrastructure of UK racing at ground level varies. Staffing in race yards is often hierarchical, with the greatest number of employees working as racing grooms, followed by 'head' roles (head lad/lass, head travelling groom), assistant trainers and finally trainers in fewer numbers (BHA, 2019; NARS, 2019). However, for yards run as small rural enterprises, with less available staff at ground level (BHA, 2019), staff sickness, injury or changes to work efficiency due to such problems pose a significant threat to the running of these establishments. Injury could not only affect an individual working in racing but undermine the daily functioning of a training yard, and quickly impact standards of horse welfare. It is therefore imperative that further research is undertaken to determine how fixture lists, and working hours and sleep may affect injury rates in stable staff.

Job security may influence injury risk, with employees in temporary, casual or part-time roles between 1.8 and 3.26 times more likely to experience injury compared to those in permanent positions (Sakurai *et al.*, 2013). The racing industry is currently perceived to have a staffing crisis by both its employees and the wider media, with reports of inadequate management practices, low staff satisfaction and retention, and pay concerns highlighted by employees (Public Perspectives 2018, 2016; Sear, 2018; Speed and Anderson, 2008). In 2018, 40% of trainers reported issues with employment, and 21% of all permanent roles required annual recruitment (Public Perspectives, 2018, 2016), creating instability in the workforce. In addition, job satisfaction in stable staff has decreased since 2016 (80% in 2016 compared to 75% in 2018), and 50% of permanent vacancies in racing are considered hard-to-fill, compared to 33% nationally (Public Perspectives, 2018, 2016). Instability in the workforce can lead to misinformation regarding health and safety protocols, resulting in higher injury rates of staff (Sakurai *et al.*, 2013), however this has yet to be investigated in racing. Recent research identified that staff across roles within racing still perceive the industry is experiencing a staffing crisis, highlighting relentless fixture lists, limited work-life balance and lack of managerial skills in senior staff as ongoing issues (Juckes *et al.*, 2020). Attrition of staff in their mid-twenties could fracture the cyclical nature of teaching and skills sharing which the racing industry has historically been built on, as invaluable expertise leaves the sector and experienced

staff members fail to pass their knowledge on to the next generation of staff (Butler *et al.*, 2019). This knowledge may include health and safety strategies, knowledge of horse care and management practices, and preventative injury measures, all of which could perpetuate the injury risk to stable staff, due to workplace instability (Butler *et al.*, 2019; Sakurai *et al.*, 2013). This would therefore suggest that due to the current occupational climate of racing, there is a higher risk of injury for stable staff resulting from an unstable workforce, low retention and high employee turnover.

Psychological and mental health play significant roles as both an antecedent of injury, and in responses to the injury event in sport and occupational health, as well as long term recovery (Petrie and Falkstein, 1998). The psychosocial aspect of occupational health and injury risk is becoming more prominently researched in wider contexts. The results conclude that increased emotional demand, decreased job control and satisfaction, increased job demands, and role conflict are all significant risk factors for work-based injury (Johannessen *et al.*, 2015; Sakurai *et al.*, 2013). Occupational research proposes that jobs with increased demand and limited job control can be classified as high strain roles (de Castro and Fujishiro, 2010). These highly demanding roles increase physiological arousal that cannot be managed effectively due to limited job control, therefore resulting in internal mental fatigue and physical exhaustion (Karasek and Theorell, 1990; Van Yperen and Hagedoorn, 2003). This is referred to as the Job-Demand-Control Theory (JDC) and is widely considered one of the most accepted models of occupational stress and injury (Karasek and Theorell, 1990; Sear, 2018). Job control is defined as the feeling of autonomy in the workplace, through control over work shift patterns, hours, and responsibility for management and timing of daily tasks and is often limited in high risk roles due to health and safety (Van Yperen and Hagedoorn, 2003). Racing grooms are required to work long hours, with increasing weekend shift work due to the expansion of the fixture list and anecdotal reports of struggling to access doctor's appointments or co-ordinate calendars for off-work activities due to ever changing schedules (Racing Welfare, 2012; Sear, 2018; Speed and Anderson, 2008). In addition, staff are required to demonstrate stringent management practices to ensure high standards of horse care and consequently welfare. The rigour of these management practices can result in perceived loss of job control, which was recently reported by stable staff in an industry study (McConn-Palfreyman *et al.*, 2019). Lower job control, combined with a highly demanding role, can result in racing grooms being classified as a high strain job role. Employees in high strain occupations may also lack the ability to recover if annual leave or days off are limited, or if off-work situations are directly linked to job role, i.e. provision of employee housing, as observed in the racing industry (Racing Welfare, 2012; Van Yperen and Hagedoorn, 2003). The inability to recover can lead to accumulation fatigue, reduced coping mechanisms and subsequent injury from poor decisions (Landolt *et al*., 2017).

Psychosociocultural risk factors

Whilst work-related stress is a significant contributor to injury, there are other reported factors that can increase injury risk, including stressful life events, social isolation, anxiety and drug misuse (Singh and Connoy, 2017; Trimpop *et al.*, 2000b). A number of psychosociocultural predictors were identified during the review process: life stressors, mental health and drug misuse. Andersen and Williams' (1988) early model of stress and athletic injury proposed that life stressors were a significant risk factor for injury. Life stressors can be classified under two areas: daily life stressors are mundane problems such as arguments at work, traffic or pressure from deadlines and result in immediate psychological distress, whilst major life stressors such as child abuse, unemployment, injury or death, are less common, but have prolonged psychological responses (Selye, 1978; Singh and Connoy, 2017). Life stressors are proposed to affect injury risk due to altered cognitive function, memory loss, reduced decision-making

capabilities, sleep disruptions and impaired relationships (Kim, 2008; Singh and Connoy, 2017).

In addition to the daily demands experienced by those working in the sector, horseracing may pose unique stressors that could induce prolonged psychological distress, such as the high fatality rates of horses under staff care due to injury or disease, or catastrophic injuries to peers (Balendra *et al.,* 2008; Hitchens *et al.,* 2019; Hitchens *et al.,* 2013; Parkin *et al.,* 2006; Pinchbeck *et al.,* 2004; Williams *et al.,* 2014). Within dyadic sports, where two athletes compete as part of a double, pair or team, seeing a teammate injured can cause significant psychological distress, known as vicarious trauma (O'Neill, 2008). Day and Schubert (2012) identified that gymnastic athletes became psychologically distressed when witnessing vicarious trauma, and all identified an increased awareness of their own frailty and susceptibility to injury. In addition, O'Neill (2008) reported that sporting athletes increased their use of fear words as descriptors in training following injury of a teammate. Witnessing another person's trauma, or supporting them during a traumatic event, are recognised types of stress-induced injury (Newell and MacNeil, 2010). In the racing industry, a 'team mate' may include other stable staff, who may not identify as athletes *per se* but nevertheless experience physical and cognitive demands akin to most sporting professionals, or the horse, who is culturally considered the most important party in racing (Richardson *et al.,* 2019). Bennett and Rohlf (2005) highlighted that animal caregivers were at great risk of stress induced injury, due to increased time investments, empathic understanding of the animal, and the bond created in caring for that animal. Research in wider equestrian sports suggests that equine injury can cause significant psychological harm to the owner/rider, providing a bond is formed between horse and human (Davies *et al.,* 2018; Davies and James, 2018). The emphasis of putting the horse first in the racing sector (McConn-Palfreyman *et al.,* 2019; Racing Welfare, 2012; Sear, 2018), and the time spent with the horses, mean bonds are often formed between stable staff and the horses in their care. Numerous racehorses are lost during training or racing each year, with many experiencing fatal injuries or cardiovascular episodes (Parkin *et al.,* 2006; Pinchbeck *et al.,* 2004; Williams *et al.,* 2014) suggesting that equine injury could be seen as a repetitive life stressor for racing staff.

Significant or repetitive life stressors can result in serious psychological distress (SPD), which is a non-specific psychological disorder, including a plethora of psychiatric symptoms, that are severe enough to cause occupational or social functioning impairments (Kim, 2008). SPD is usually sequential to a traumatic life event and can cause increased susceptibility to pain and decreased stress tolerance (Kim, 2008). Compromised cognitive processing may explain the difference in physical interpretation of post-injury pain, disrupt the biomechanical efficiency of a skill or task, alter motor patterns or training demands due to overcompensation mechanisms, and decrease attention and visual acuity, which can all lead to an increased risk of injury (Heil, 1993). In addition, research has highlighted that SPD suffers are 36% more likely to experience occupational injuries, and have a greater number of days off, compared to non-sufferers (Kim, 2008). Due to the high incidence of injury to both staff and the horse within the racing sector, stable staff may be at risk for developing SPD due to repeat exposure to trauma, and combined with poor coping mechanisms may therefore be at a greater risk of personal injury (Landolt *et al.,* 2017; Losty *et al.,* 2019; McConn-Palfreyman *et al.,* 2019; Racing Welfare, 2012).

Recent research has highlighted an array of mental health concerns in athletes, including eating disorders, burnout, depression, anxiety, suicidal ideation, gambling, hazardous driving, unprotected sex and substance abuse (Hughes and Leavey, 2012; Putukian, 2016; Sundgot-

Borgen *et al.*, 2010). As many as one in two athletes experience psychological stress during their career and this is no different in the racing sector (Losty *et al.*, 2019). Jockeys reported exhaustive schedules, high risk occupations, unrealistic weight expectations, public scrutiny, burnout and injury as risk factors for poor mental health, and 53% of jockeys surveyed in a recent study demonstrated symptoms concurrent with at least one mental health issue (Losty *et al.*, 2019). Whilst more research has been undertaken in jockeys due to the influence on their performance, similar demands are experienced by stable staff, who also report long hours, relentless schedules and high risk tasks as part of their daily role (Filby *et al.*, 2012; Filby and Jackson, 2016; Juckes *et al.*, 2020; McConn-Palfreyman *et al.*, 2019; Racing Welfare, 2012). These demands are consistent across jockeys and stable staff, suggesting that the risk factors are associated with the industry rather than the specifics of a chosen role, and that stable staff may be at risk of mental health concerns due to this. Figley and Roop (2006) also reported that those working in animal care occupations may be vulnerable to depression due to self-sacrificing behaviours often associated with putting the animal first, a common culture seen in racing. Recently, a survey of wider stable staff highlighted 72% of training yard staff experienced stress, anxiety or depression in the last 12 months, whilst less than 23% reported on health concerns (McConn-Palfreyman *et al.*, 2019). Landolt *et al.* (2017) suggested that occupational and life stressors are the biggest contributors to injury risk factors, and subsequent negative mental health. Stable staff in training yards and stud establishments recently highlighted concerns over pain maintenance and the disparity in physical and psychological support available to staff in the industry compared to jockeys and other professions (McConn-Palfreyman *et al.*, 2019). The recent data from racing suggest a mental health concern for staff working within the racing sector and whilst this is being addressed by industry organisations such as Racing Welfare and NARs, there is currently no reported link being considered to the risk of injury in this population.

Chau *et al.* (2008) reported significant increases in injury risk within the general population for people who smoked, took drugs and misused alcohol. Drugs and alcohol misuse are the less publicised coping mechanisms for poor mental wellbeing and are frequently inter-related conditions (Hayes, 2012). In the United States, prescription drug abuse doubled from 2002 to 2005, and tripled from 2005 to 2008, suggesting a serious endemic issue (Hayes, 2012). Prior drug use is a concern due to the implications for pain severity and social isolation, which usually correlates with drug misuse (Hayes, 2012). Pre-injury drug use can influence regulation of pain when injured, with an increased experience of pain severity and a need for increased pain management strategies in people who routinely abuse opioids (Campbell and Edwards, 2009). Within stable staff, drug misuse has been previously reported (~9% of training yard staff, ~9% of stud staff) (McConn-Palfreyman *et al.*, 2019; Racing Welfare, 2012), which could further compound the risk of injury.

Psychological responses to injury

Injury alters a person's assumptions about the safety of their proximal environment and has far reaching connotations on self, world and future viewpoints (Brewin and Holmes, 2003). Following an injury, stable staff are likely to experience complex psychological responses to injury, including changes in cognitive appraisal, emotional responses and behavioural changes, similar to those seen in injured athletes (Wiese-Bjornstal *et al.*, 1998). Cognitive appraisal and the subsequent emotional and behavioural responses of athletes have been extensively studied in a range of sports, and studies have utilised qualitative and quantitative methodologies to monitor short and long term responses to injury (Davies *et al.*, 2018; Davies and James, 2018; Mitchell *et al.*, 2014; Rees *et al.*, 2010; Wiese-Bjornstal *et al.*, 1998). The cognitive appraisal process suggests that injury triggers a cognitive evaluation, including the assessment of their

coping resources, injury severity and prognosis for recovery, the re-adjustment of goals and subsequent sense of relief or loss dependent on whether goals are met (Wiese-Bjornstal *et al.*, 1998). The cognitive appraisal at the onset of injury can influence a person's emotional responses; a positive appraisal of coping ability post-injury may lead to a positive emotional response, whereas a sense of loss resulting from injury may lead to emotions such as grief, fear, frustration or anger (Thatcher *et al.*, 2007; Tracey, 2003; Walker *et al.*, 2007). Initial grief responses, similar to those reported in Kubler Ross's Grief Theory (1969), mimic loss, shock and emptiness, often classified as devastation (Rees *et al*., 2010). The loss of sport participation, or unfavourable progression with rehabilitation, leads to restless behaviour, frustration or anxiety about an athletes return to sport, whilst feeling cheated has been reported in many athletes, where an injury has resulted in a loss in achievement, or required the readjustment of goals (Mitchell *et al.*, 2014). For stable staff, this frustration or restlessness may result from an inability to undertake daily working tasks fully, being unable to manage the horses in their care due to physical limitations or slow recovery processes and pain, resulting in psychological distress. However this has yet to be investigated.

Following emotional responses, a person will likely experience behavioural changes in response to the injury (Wiese-Bjornstal *et al.*, 1998). Behavioural responses include adherence to rehabilitation activities, use of psychological skills strategies, use or disengagement from social support, risk taking behaviours and behavioural coping techniques (Wiese-Bjornstal *et al.*, 1998). These responses will influence a person's ability to return to activity, such as sport or work, successfully, and the quality and efficacy of their rehabilitation (Santi and Pietrantoni, 2013). Many sporting athletes fail to return to their pre-injury level of performance, and this is often attributed to the lack of pre-emptive educational measures or interventions provided to them to support coping resources and ability to review and reflect goals in a constructive manner (Arvinen-Barrow and Walker, 2013). These interventions reduce the denial and distress phases of the affective cycle of injury model, associated with the emotional response to injury (O'Connor *et al.*, 2005). By reducing the denial phase at the onset of injury, athletes are more likely to take an active role in their rehabilitation, refocusing goals to make use of their rehabilitation to improve other constructs such as strength, endurance or confidence, and is defined as determined coping, or more recently, sport injury related growth (SIRG) (O'Connor *et al.*, 2005; Wadey *et al.*, 2019, 2012). This has recently been seen in jockeys, with the continued growth and development of post injury resources and focus on improved physiological and psychological recovery (Injured Jockeys Fund, 2019; Professional Jockeys Association, 2020). Determined coping is seen earlier in athletes who undergo early education interventions focussing on managing emotions, goal setting to enhance motivation and resilience and the provision of social support (Santi and Pietrantoni, 2013). It is therefore suggested that similar educational interventions should be offered to working stable staff in the industry to facilitate psychological recovery, once psychological responses are understood.

Maladaptive responses to injury

Maladaptive psychological states, such as prior anxiety or depression, can also affect injury recovery (Chin *et al*., 2017) and may stem from underlying trait anxiety or have developed from life stressors. Clinical depression can increase cortical activation in pain contexts, resulting in an increased experience of pain severity, which could alter adherence to rehabilitation and increase fear of movement (Campbell and Edwards, 2009; Haythornthwaite *et al.*, 1991). Depression post injury has also been linked to increased absenteeism, decreased productivity and increasing healthcare costs in wider sectors, likely as a result of poor injury recovery (Keyes, 2002). Depression is a global public issue, affecting more than 264 million people worldwide (World Health Organisation, 2019), and is not uncommon in athletes (Proctor *et al.*,

2010), and has been previously reported in jockey and stable staff populations (Losty *et al.*, 2019; McConn-Palfreymann *et al.*, 2019). Stress and anxiety can also affect pain at the onset of injury; anxiety has a similar physiological response as pain, utilising similar hormone and immunological functions, and is often classified as a potentiator of pain (Ozalp *et al.*, 2003). Increased anxiety is correlated to an increased perception of pain due to a down-regulation of immune function resulting from an increase in stress hormones which interfere with pain modulation (Kiecolt-Glaser *et al.*, 1998). Increased pain at the onset of injury can result in avoidance behaviours, social isolation and increased psychological distress (Eccleston, 2001). Anxiety, independent from its impact on pain recognition, is also likely to alter someone's recovery behaviours, with increased anxiety correlated to decreased adherence to rehabilitation, usually linked to social isolation or fear of negative social evaluation, stemming from a lack of confidence (Kiecolt-Glaser *et al.*, 1998; Reuter and Short, 2004).

Depression and anxiety can lead to increased substance abuse as a means of coping (Hayes, 2012), which can also negatively impair recovery from injury (Eccleston, 2001; Hanin, 2000; Kiecolt-Glaser *et al.*, 1998; Petrie and Falkstein, 1998; Putukian, 2016). Substance use is considered to modulate emotional reactions; for example alcohol has been shown to counter manic symptoms whilst cocaine has been shown to modify depression, both aiming to increase mood (Putukian, 2016). Alterations in mood or cognitive status of an individual has been shown to affect adherence to rehabilitation, with increased anger resulting in withdrawal from treatment programmes, and more positive mood profiles linked to better recovery (Eccleston, 2001; Kiecolt-Glaser *et al.*, 1998). False positive moods from drug use however may result in 'crashes'; extreme low moods as a result of withdrawal from substances and may then result in increased self-destructive behaviours and negative self-appraisal (Eccleston, 2001). Furthermore, decreased task attention has been reported to link to high risk situations, including substance abuse, which could increase risk of re-injury during a rehabilitation session (Hanin, 2000). In addition to altering the psychological state of an individual during recovery, drug and alcohol misuse also directly affects physiological state. Alcohol misuse can cause retardation of healing, with delays in cell migration and collagen production, resulting in a suboptimal and longer recovery (Kiecolt-Glaser *et al.*, 1998). In military professionals, alcohol is considered the most common coping method post injury, often stemming from pre- or post-injury depression (Hayes, 2012). Substance abuse has been reported in the racing sector as a method of coping, and "a strong predilection for somewhat eccentric socialising" has been seen (Racing Welfare, 2012, pp. 17), however the research is still inconclusive about the extent of substance misuse in the sector, and may be subjective to population bias or self-report measures (McConn-Palfreymann *et al.*, 2019; Racing Welfare, 2012). Populations with higher levels of anxiety, depression or drug and alcohol problems prior to or resulting from injury may experience increased negative appraisals of injury, and delayed recovery. Further research is needed to evaluate whether these risk factors are currently influencing injury risk and recovery in racing stable staff.

Social support and Rehabilitation

Within the racing industry, 44% of employees signalled that their employer was "not supportive at all" in response to their injury rehabilitation, which could affect rehabilitation success and recovery in stable staff (McConn-Palfreyman *et al.*, 2019, pp. 39). Trauma within the workplace can create a distrust in senior staff, who are entrusted with care of employees and a sense of betrayal may be formulated here which can further affect communication between staff and employees (Brewin and Holmes, 2003). Social support, such as from employers, friends, family or colleagues, is particularly important in maintaining adherence to rehabilitation. Social support is one of the most frequently cited psychosocial resources (Rees and Hardy, 2000;

Thoits, 1995) but definitions are often varied. As a construct, social support has been linked to the size of a network or community, social integration of an individual, the quality and quantity of relationships formed, and social resources (Rees and Hardy, 2000). Disengagement from a community after injury can lead to feelings of isolation, which is negatively associated with adherence to rehabilitation (Harris, 2003; Rees *et al.,* 2010). Social support is considered a key factor in coping with injury, and can be considered positive, negative or neutral. Udry *et al.,* (1997) suggested more athletes reported negative social support than positive, with 54% of unhelpful supporters being family members in Lehman *et al.,*'s (1986) research. Comparatively, in military personnel, home based social support (including family members) has been shown to be a protective factor for veterans at risk of suicide (DeBeer *et al.,* 2014). In racing, there may be dual roles regarding social support, as racing is considered a family business whereby partners, siblings or parent/child relationships may work together thus creating tension if acting as both a co-worker and a social support mechanism (McConn-Palfreyman *et al.,* 2019; Sear, 2018; Speed and Anderson, 2008). Involvement of family may be perceived differently depending on the emotional responses of the individual. Research suggests anger can weaken the recognition and effectiveness of social support by pushing away those closest to the injured person (Wilks *et al.,* 2019), whilst quality of relationships with family could play a role in perception of support (Rees and Hardy, 2000). Research suggests that post trauma, negative social support, such as criticism or indifference to the wellbeing of that person, has a greater impact on successful recovery outcomes than lack of support (Brewin and Holmes, 2003). It is likely that friendship groups in racing will be formulated based on work relationships, due to an increased time spent at work, and housing often given to staff as part of a benefits package when working in the sector (NARS, 2019). This may result in a lack of availability of wider social groups to discuss injury without fear of social evaluation or appearing weak which could further isolate staff working in this sector.

Previous research in sport has suggested that expertise in the area, or shared injury experiences, was influential in support preferences (Bianco, 2001) to support an injured athlete. Hogan *et al.* (2002) suggest that mutual interventions with athletes in similar injury situations is more effective than individual sessions, and equestrian-specific support systems have been identified as more positive networks of support (Davies *et al.,* 2018). The need to promote social engagement within rehabilitation plans to promote psychological growth is evident and interestingly, stronger support systems at work could also reduce injury incidence (Trimpop *et al.,* 2000a). The current staffing climate within the racing industry may not be conducive to the social development of a team on a race yard due to fluctuating employee numbers and retention issues, which could alter team dynamics and influence injury risk and likelihood of successful recovery. McConn-Palfreyman *et al.* (2019) reported that both training and stud stable staff wanted psychological support to mirror that currently available for jockeys, which currently includes individual and group psychological support for injury recovery further highlighting the need for intervention in this population. Athletes in higher risk sports, such as horse racing, are also more likely to respond better to management interventions, making this population an appropriate sport to investigate the benefits of reactive and pro-active coping strategies (Gledhill *et al.,* 2018). Although racing staff may not view themselves as athletes, their engagement in high risk activities and physiological demands of their job role would suggest that they too would also respond better to management interventions.

Whilst there is typically a concern for practices related to a lack of, or low rehabilitation adherence in sporting research, due perhaps to lack of intervention, pain perception, social isolation and negative cognitive appraisals, there is an equally distressing concern for someone demonstrating over-adherence behaviours (Podlog *et al.,* 2013). Overadherence to

rehabilitation can be defined as exceeding recommended medical guidelines, and research in sport and military sectors has seen injured people acting directly against recommendations, returning to sport prior to full recovery and a perception that it is socially expected to ignore, supress or hide pain when injured (Hall, 2011; Podlog *et al.*, 2013). This again echoes a sociocultural element to injury recovery, proposing that social viewpoints on injury as a weakness may lead to an increased likelihood of "*being pushed beyond tolerable stress [or pain] levels*" (Hall, 2011, pg. 14). Overadherence is more likely in athletes with increased athletic identity, or who are motivated by their perception of others and desire to make an impression, which can be linked more to males than females in military culture (Cohen *et al.*, 2019). This often leads to risk taking behaviours, such as continued engagement in sport against advice, denial of injury severity, and avoiding reporting injuries at all (Podlog *et al.*, 2013). Increased likelihood of over adherence behaviours has been linked to particular personality types, including those with high neuroticism tendencies, and increased trait anxiety. Recent research in wider equestrian disciplines suggests high levels of neuroticism in younger riders, a trait characterised by emotional instability, difficulty coping and negative affect, suggesting riders may be at risk of over adherence practices (Wolframm *et al.*, 2015). Horse riders have previously been reported to return to sport earlier than medically recommended following a serious injury, despite reports of pain and limited function (Perlo and Davies, 2017). Assuming riders and racing staff share similar characteristics of the "*horsey*" identity discussed by Dashper (2016), it is important to investigate whether overadherence is a problem within injured stable staff. Further research should seek to determine the relationship between psychological responses to injury and rehabilitation adherence in racing stable staff allowing for more appropriate physical and psychological interventions to take place.

Under-reporting and Injury Denial

A culture of under-reporting or injury denial has been seen in jockeys, who hide or downplay injury or injury severity to avoid being signed off by the Chief Medical Officer so they can continue to ride (Hitchens *et al.*, 2013; Turner *et al.*, 2002; Waller *et al.*, 2000; Whitlock, 1999). Athletes who experience denial may refuse or disengage with necessary rehabilitation (Harris, 2003), often resulting in emotional instability, leading to stronger emotional reactions and increased difficulty in coping with stress (Samuel *et al.*, 2015). Within a recent industry report, 37% of racing industry staff reported injuries in the last 12 months but only 38% took any time off related to that injury (McConn-Palfreyman *et al.*, 2019). Injury reporting and access to treatment/rehabilitation is considered a concern in the racing industry, with anecdotal reports of staff unwilling to take sick leave or continuing to work despite chronic pain or injury (McConn-Palfreyman *et al.*, 2019; Racing Welfare, 2012; Sear, 2018; Speed and Anderson, 2008). Staff often cite a love of the job, moral or ethical obligations (for example to animal welfare), or concerns for job security as reasons for not taking adequate time off (Johns, 2011; McConn-Palfreyman *et al.*, 2019).

Presenteeism is not an uncommon occurrence in other lifestyle occupations, for example, 49-58% of musculoskeletal injuries go unreported in the military (Sauers *et al.*, 2016), whilst dancers report continuation of training despite severe musculoskeletal injury (Turner and Wainwright, 2003). Referred to as an injury minimalization culture, military personnel report the inconvenience of seeking medical treatment, fear of impact on their careers, knowing how to treat themselves, and the cultural perspective to "suck it up" and 'work through it' mentalities in the military as being key reasons not to report injury (Cohen *et al.*, 2019; Sauers *et al.*, 2016, pp. 1077). The racing industry could also be suggested to have an injury minimalization culture; discussions with staff highlights a need to appear fearless and brave, to hide injury and carry on, similar to those themes reported in military culture (Racing Welfare, 2012; Sear, 2018). It

could therefore be expected that similar experiences may be reported as reasons for presenteeism within the racing staff. This cultural norm may not specifically be fostered from working within the racing industry. In professions where caring for others, particularly animals, is a requirement, employees often report a worry that no one can replace their standards of care leading to guilt for taking time off, and as such they must continue to work despite physical injury or psychological distress (Figley and Roop, 2006). This can also be considered true for the wider equestrian sector, and racing staff may have learnt this cultural norm from previous experience with horses before entering racing, where the habitus was reinforced. Dashper (2014) suggests guilt is experienced by horse riders when they put decisions about their own career progression ahead of the horse, which could be seen here when injured staff are prioritising their own needs and career ahead of daily management and care of the horses in training. The love of the horse is often reported as a reason to maintain engagement within the industry (McConn-Palfreyman *et al.,* 2019), and as such these factors may increase the risk of underreporting or presenteeism post-injury in stable staff.

Employees within the racing industry are also reported to suppress and regulate emotional displays to meet the organisation's expectations of the role (Sear, 2018), which Cassidy (2002) suggested creates an organisational culture where the employees act, think and feel in accordance to expectations, and new staff entering are taught to adhere to these cultural norms. This culture, often referred to as institutional habitus (Bourdieu, 1984), may increase the incidence of denial within staff regarding injury risk due to not wanting to appear weak or go against the cultural norm, or for fear of losing their job (McConn-Palfreyman *et al.,* 2019; Racing Welfare, 2012). Institutional habitus, particularly related to injury expectations, has previously been reported in military personnel, boxing, dancers and veterinary professionals (Day and Schubert, 2012; Turner and Wainwright, 2003; Vassallo *et al.*, 2019; Wainwright *et al.,* 2005). Hall (2011) concluded that military culture had three psychological traits; secrecy, stoicism and denial. These three traits created an institutional habitus that promoted successful performance but often led to a delay in reporting injury, and members who were likely to push beyond the boundaries of tolerable stress and pain to maintain those traits (Hall, 2011). In dance, the institutional habitus formed by a dance company's ethos and social relationships dictates a need to appear strong for the company, and to expect tolerance of pain as part of their social contract (Turner and Wainwright, 2003). The cultural expectations of the habitus override any prior cultural, religious or ethnic diversity, and the member is now belonging solely to the habitus they joined (Hall, 2011). For dancers, the historical and cultural norms of hiding pain and injury are so ingrained that researchers and practitioners have questioned whether pragmatic strategies for pain management and injury recovery are getting through to athletes suggesting a need to focus on organisational culture as well as practical management strategies within the racing industry.

Within the racing industry, there is currently a staff shortage, which can lead to issues with being covered if off sick or injured (Filby, 1987; Public Perspectives, 2018; 2016; Sear, 2018). Different to the psychological belief that an employee is irreplaceable discussed previously (Figley and Roop, 2006), the current working conditioning within racing highlights a physical lack of staff who can cover shifts. This was recently highlighted as a concern for trainers in Sear's (2018) study, whereby finding staff cover was reported as a main source of stress for those working in industry. Injured employees or players has been previously highlighted as a significant source of stress for managerial or coaching staff, who are in positions of responsibility to 'fill the gaps left by injury' within a team, much the same as a trainer (Sear, 2018; Thelwell *et al.,* 2008). If this stress is made known, directly or indirectly, to a team of subordinates, that team may alter their behaviours, and subsequently hide injuries or pain, in

order to reduce stress on their manager, particularly where good relationships have been developed. In addition, within the racing sector, the requirements to maintain high standards of care of the horses is vital for the success of training yards, thus making it more likely for employees to continue working despite the need for rest or recovery. Employees or athletes may also reduce reporting behaviours to avoid guilt for letting the team down, which has been seen in injured athletes (Bianco, 2001; Mosewich *et al.*, 2013; Podlog and Eklund, 2007). Guilt is defined as a feeling of responsibility and is often related to one's view of oneself and others' expectations, such as expectations for injury management developed from an institutional habitus (McNamee, 2002). It is considered as one of the more threatening emotions in response to injury as guilt can result in separation from the social support that is essential to facilitate recovery (Harris, 2003). The close working relationships within the racing industry, as well as the current staffing crisis (Juckes *et al.*, 2020) and cultural focus of 'horse first' (BHA, 2020) may increase the likelihood of staff experiencing guilt for taking time off, and thus continue to work whilst injured.

Within other physically demanding occupations, when psychological or physical ability is a barrier to completing the job, opportunities are often available to move into non-physical roles, either in management or office work (Putukian, 2016; Singh and Connoy, 2017). In sport, opportunities for coaching or teaching roles are often preferred, or career progression takes a downwards trajectory towards less elite clubs (Hughes and Leavey, 2012). However, racing staff suggested that a transition to a non-riding role was the inferior choice, felt like a weakness, and considered it "*too painful to know you could never ride again*" (Racing Welfare, 2012, pp. 48) and due to the unpredictable nature of racehorses in training, limited opportunities exist to gradually decrease aspirations (McConn-Palfreyman *et al.*, 2019). The accessibility of alternate career paths may make it easier to accept post-injury limitations, and therefore increase the likelihood of reporting an injury at its onset (Reuter and Short, 2004). The lack of accessibility or desire to come away from the ridden aspect of racing may increase fear of injury in racing staff, increasing the likelihood that injuries are unreported. Fear of the unknown is considered a significant factor in fear of reinjury, which can negatively affect rehabilitation outcomes and post injury recovery due to under or over adherence practices (Vassallo *et al.*, 2019). This could therefore suggest that industries where career pathways are outlined clearly and multiple opportunities exist for continuation at lower intensities, employees may be more likely to report injury and adhere to prescribed injury rehabilitation strategies as wider opportunities exist for them should they wish or need to leave the job. Stud staff recently highlighted issues with the quality and availability of training for career progression, suggesting a gap in provision, although this has since been addressed by the British and Irish racing industries (McConn-Palfreyman *et al.*, 2019). A lack of visible alternative opportunities could increase the fear of injury in this population, and therefore decrease the likelihood of reporting injury to managerial staff. This would therefore suggest that failure to be active within a preferred role in their chosen occupation may result in stable staff experiencing high levels of psychological distress as a result of direct injury due to having a lack of a contingency plan for their career.

Limitations and Future Research

The use of a narrative approach poses several limitations commonly seen in narrative literature reviews. There is an increased risk of selection bias compared to systematic reviews, as the researcher is subjectively choosing articles to include within the review (Ferrari, 2015; Green *et al.*, 2006). The risk of selection bias was mitigated in this review by utilising predetermined inclusion and exclusion criteria when selecting studies, as recommended by Pare and Kitsoiu (2017). In addition, care should be taken regarding the interpretation and analysis of the

literature, as conclusions have been formulated on the best available evidence in the field, and may be open to subjective interpretation (Ferrari, 2015; Minichiello *et al.*, 2018).

This review has identified numerous gaps within the literature that the industry should seek to address and theorised how racing staff may be influenced by psychology of injury based on wider fields. However, these theories have not yet been confirmed through research. Future studies should consider investigations into horseracing specific risk factors for stable staff, to identify occupational and psychosocial risk factors that increase the risk of injury in this population, with the aim to increase preventative strategies and educational opportunities through yard management and racing organisations. In addition, exploration of the psychological effects of injury in racing staff should also be undertaken, to support the development and growth of Racing Occupational Health services and to determine how to support staff who are experiencing injury and promote health and wellbeing of staff.

Conclusion

Multiple risk factors have been identified that may affect injury incidence within racing stable staff. Risk factors include physical horse-related risk, organisational structure, job control and working conditions, and the cultural norms of injury underreporting that could limit staff seeking correct medical care and rehabilitation. There are serious physical and psychological consequences for injury mismanagement, including increased risk of more serious injuries, prolonged healing and chronic pain as well as decreased performance, loss of workdays and long-term disability or impairment, usually resulting in forced retirement however these have yet to be investigated within racing staff. Occupational health of stable staff is a key priority for the racing industry, and further research into the prevalence, antecedents and psychological responses to injury is recommended to ensure thorough understanding of the impact of injury in racing staff. It is critical to identify if mismanagement of injury exists within the racing sector and if so, to devise strategies to support employers and employees to minimise the negative impact of this on human and potentially equine welfare.

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